

Instrumentation and Measurement for GENI

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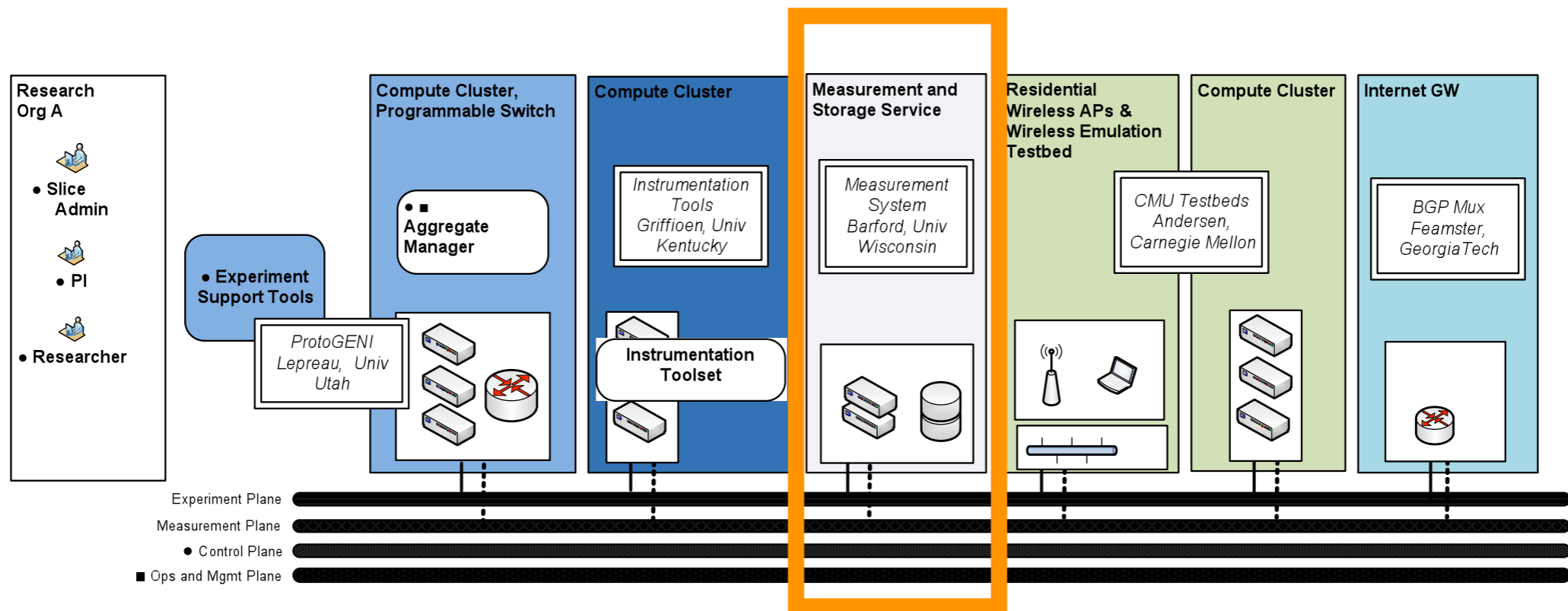
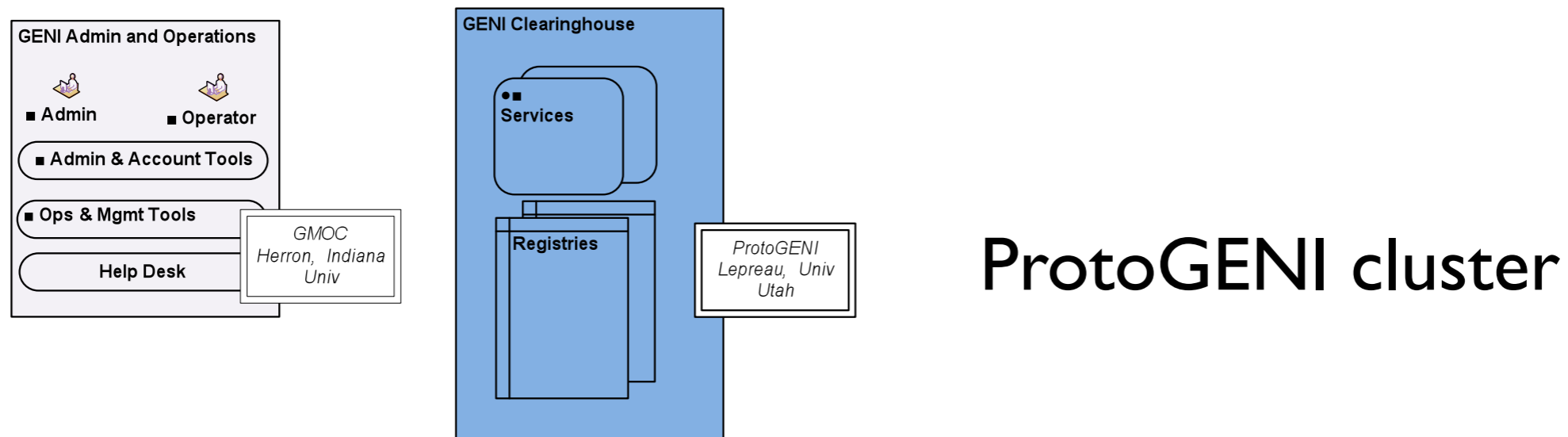
Motivation

- The ability to measure must be intrinsic to any test instrument (e.g., the LHC)
- The wide range of experiments envisioned for GENI calls for comprehensive instrumentation and measurement capability
- Measurement systems available today are limited (e.g., packet capture systems or flow monitors) and insufficient

Objectives

- Develop and test a high performance measurement system that supports a wide range of experiments and can be widely deployed
 - GIMS prototype system
- Develop and test a measurement data management system and repository
- Deploy and test an initial set of measurement nodes and data repositories with interfaces to one or more control frameworks

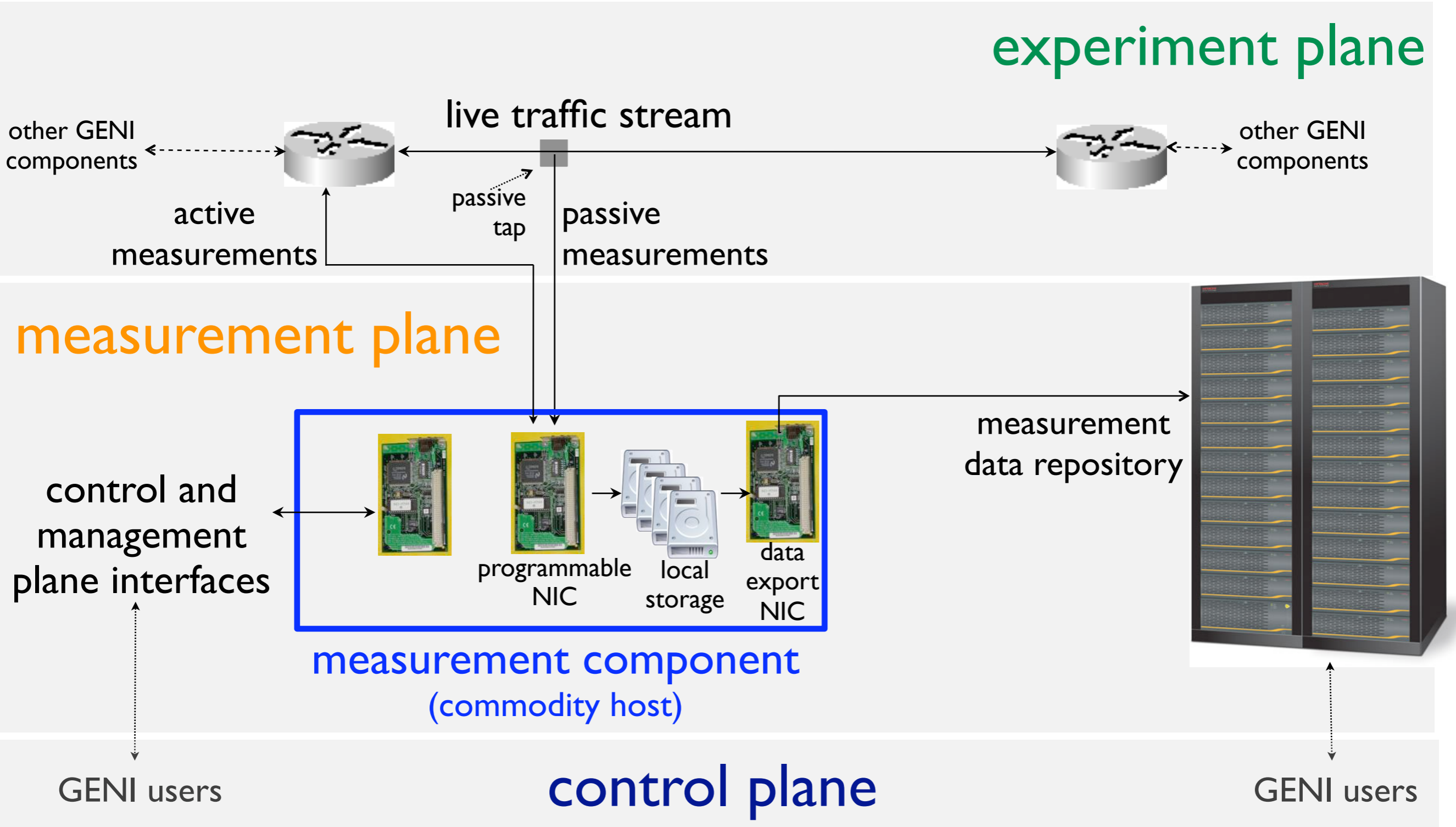
Context Within Spiral I



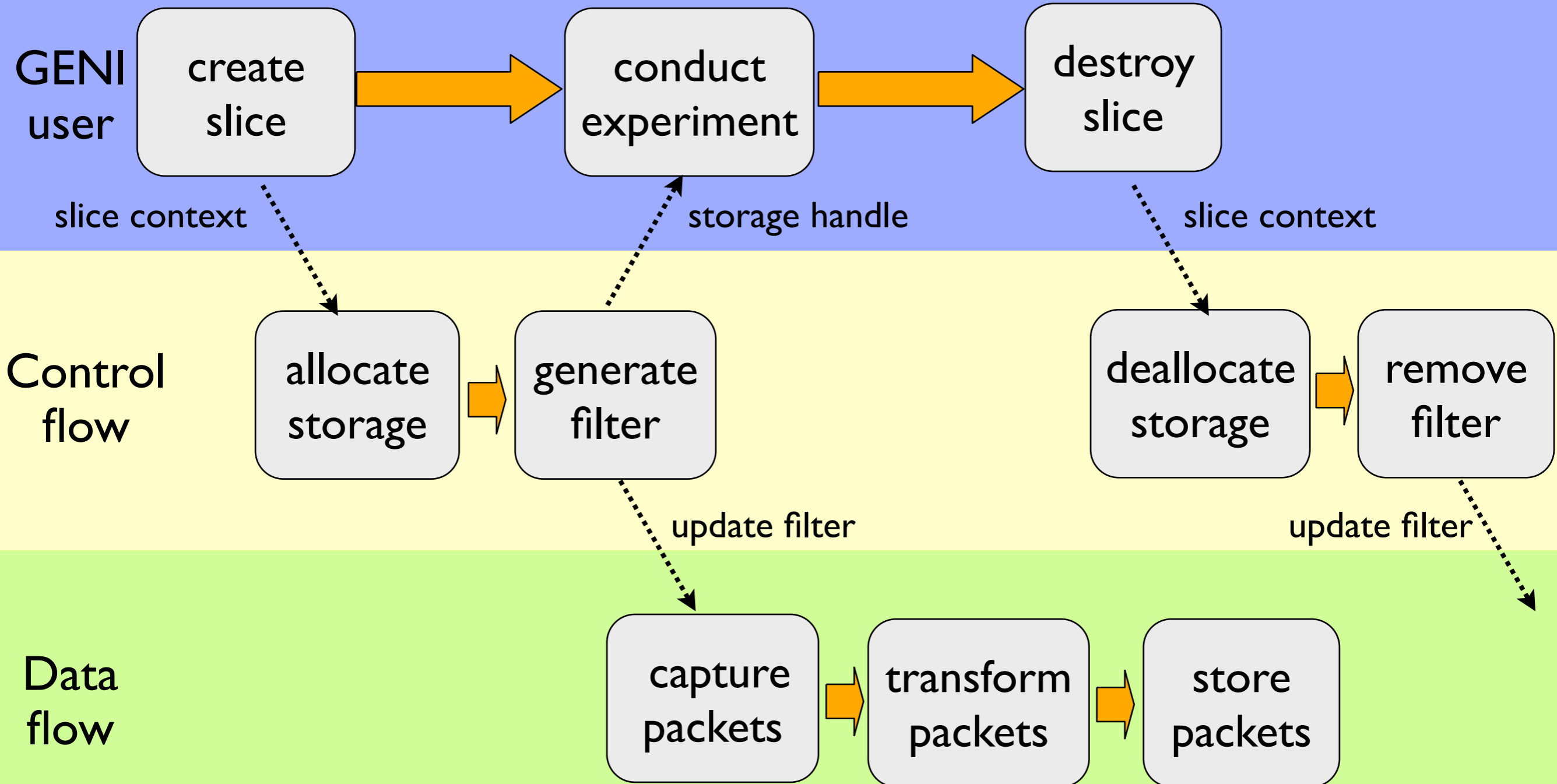
Approach

- Develop requirements and functional specifications for systems
- Build measurement system with commodity host and programmable network interface
- Build storage system with limited local store and large scale data repository
- Deploy and test in WAIL (ProtoGENI control framework) and other infrastructures (e.g., NLR)

System Design



Control and Data Flow



Challenges

- Coordinating measurement filters with active experiment slices
- Balancing data privacy and acceptable use policy enforcement with performance and flexibility requirements
- Balancing efficiency and flexibility in measurement data management

Existing Work

- Wisconsin Advanced Internet Lab (wail.cs.wisc.edu)
- *An active measurement system for shared environments.*
Sommer and Barford, IMC 2007.
- Leverage work by others
 - pktcd (Gonzalez and Paxson, PAM 2003)
 - NeTraMet (Brownlee / CAIDA)
 - Many others...

Control Framework Integration

- Minimal integration and support requirements from control framework
 - ProtoGENI is the initial target, others will follow
- Slice activation instantiates filters on measurement nodes to gather packets associated with the slice
- Standard naming (URL) in the repository for data collected from experiments

Timeline

- Year 1: develop specifications for systems, develop prototype focused on control framework interface, deploy prototype in WAIL
 - Initial focus is on passive measurement
- Year 2: develop efficient high performance packet filter for deployment, develop large scale data repository, deploy prototypes (NLR, Internet2)
- Year 3: expand functionality, broaden deployment